F ENT COOPERATION TREA

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and Administrative Instructions, Section 422)

To:

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ALLEMAGNE

Date of mailing (day/month/year)
07 August 2000 (07.08.00)

Applicant's or agent's file reference
4335/65 WO

IMPORTANT NOTIFICATION

International application No.
PCT/EP99/10100

International filing date (day/month/year)
17 December 1999 (17.12.99)

1. The following indications appeared on record concerning:

[ ] the applicant [ ] the inventor [X] the agent [ ] the common representative

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State of Nationality:
State of Residence:
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Facsimile No.: 49 511 510 63 71
Teleprinter No.:

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

[ ] the person [X] the name [ ] the address [ ] the nationality [ ] the residence

Name and Address
SKORA, Michael
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Tiergartenstrasse 122
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Germany

State of Nationality:
State of Residence:
Telephone No.: 49 511 510 63 65
Facsimile No.: 49 511 510 63 71
Teleprinter No.:

3. Further observations, if necessary:
The indication of a new address of the agent on the demand (Form PCT/IPEA/401) has been considered a request for recording a change under Rule 92bis. In case of disagreement, the International Bureau should be notified immediately.

4. A copy of this notification has been sent to:

[X] the receiving Office
[ ] the International Searching Authority
[X] the International Preliminary Examining Authority
[ ] the designated Offices concerned
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[ ] other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

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Authorized officer
F. Baechler

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International Bureau

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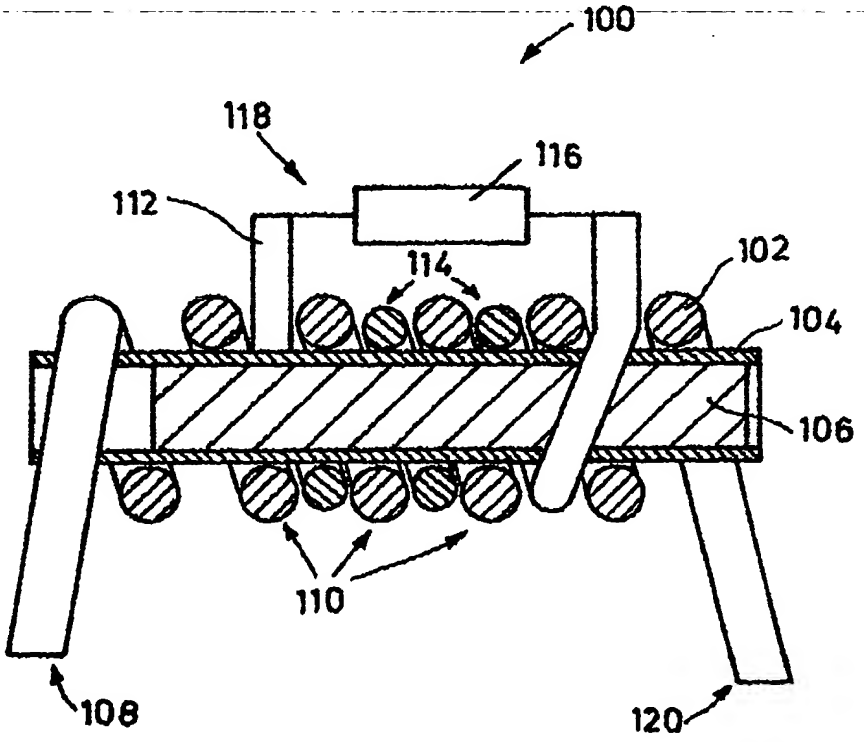
Published
With international search report.

(54) **Title:** A REMOTE FEEDER REACTANCE COIL

(57) **Abstract**

A remote feeder reactance coil and a signal transmission system. The invention relates to a remote feeder reactance coil (100) for energy input and output in signal transmission lines, as well as in signal transmission systems including signal transmission lines, where intermediate amplifiers are supplied with electrical energy via said signal transmission lines. In order to provide a reactionless connection of a high–frequency signal path and a low–frequency energy supply in signal transmission systems over an as large as possible frequency range, at the same time keeping the required manufacturing effort small, the invention provides a remote feeder reactance coil (100) including a primary winding (102) carrying a feed current as well as an attenuation circuit (118) in which at least the secondary winding (112), which is part of said attenuation circuit (118), or the primary winding (102) are of an electrically insulated conductive material, wherein said secondary winding (112) and said primary winding (102) interact through capacitive and/or inductive coupling.



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A Remote Feeder Reactance Coil

D E S C R I P T I O N

The invention relates to a remote feeder reactance coil for energy input and output in signal transmission lines as well as in signal transmission systems including signal transmission lines, where intermediate amplifiers are supplied with electrical energy via said signal transmission lines.

Signal transmission systems known from practice transmit a high-frequency signal from a signal source to a signal drain via a signal transmission line, e.g. a coaxial cable. For this purpose, large distances often need to be bridged. As a result, the high-frequency signal will become attenuated even in high-quality lines, for which reason intermediate amplifiers will be required for regenerating the signal level.

In signal transmission systems of the prior art, such intermediate amplifiers may be supplied with electrical energy via the signal transmission line - which will eliminate the need for separate supply lines. In general, signal transmission lines of this design concept are subdivided into plural transmission sections or segments interconnected via couplers which present an as small as possible resistance to the high-frequency wanted signal. Within said transmission sections, energy is input or output via remote feeder reactance coils which constitute separation points for the high-frequency wanted signal. Consequently, the wanted signal will not become substantially attenuated at the input and output sites. However, in view of the specific design of remote feeder reactance coils, there is the danger of resonances occurring at certain frequencies which will limit the useful frequency range of the signal transmission line.

Whether or not, and to what extent, resonance effects will occur depends very much on the self-resonance behaviour of the remote feeder reactance coils. For this reason, various designs have been developed in practice in which any occurring self-resonances will either be attenuated or altogether shifted to a frequency range which is uncritical for the wanted signal. For attenuating the self-resonance effects of the winding sections of remote feeder reactance coils, for example, it is known from practice to wire a remote feeder reactance coil with resistors or conductive layers. As an alternative, or commutatively to such attenuation, it is likewise known from practice to cause such a shifting of self-resonances by varying the spacing of the turns and/or of winding sections of the remote feeder reactance coil. Moreover, remote feeder reactance coils of the prior art are further known to have the turns of the reactance coil counterwound onto a common core so as to prevent the formation of any possibly resulting noise fields.

The disadvantages of the remote feeder reactance coils known from practice above all result from the fact that the self-resonances of the circuitry will strongly limit the useful frequency ranges, despite the wirings and different winding types. Furthermore, the inductance values which can be reached with the known remote feeder reactance coils are limited with given volumes. Another problem is the considerable manufacturing effort, especially when such coils are wired with resistors and conductive layers since their exact dimensions and positions will be decisive of the resonance behaviour of the remote feeder reactance coil. The same is true for the variation of the windings, so that, in summary, one can say that prior art remote feeder reactance coils make maximum demands on production engineering, in view of the required precision in manufacturing.

It is the object of the invention to provide a reactionless connection of a high-frequency signal path and a low-frequency energy supply for signal transmission systems over an as broad as possible frequency range, at the same time keeping the required manufacturing effort small.

This object is solved according to the invention by the features of claims 1 to 13.

In accordance with the invention, a remote feeder reactance coil comprises a primary winding, preferably of an electrically insulated conductive material, carrying the feed current, and an attenuation circuit of a kind which has a secondary winding of a preferably electrically insulated conductive material, wherein said secondary and primary windings interact with each other through capacitive and/or inductive coupling. Providing a secondary winding of an electrically insulated conductive material is a much less complex step in manufacturing than the comparable measures of the prior art. At the same time, its presence allows very precise and effective influencing of the self-resonance behaviour of the remote feeder reactance coil since the use of a secondary winding clearly allows more positioning and design alternatives than other means of the prior art.

The use of a secondary winding allows a well-aimed intervention in the internal function mechanism of the reactance coil which results in the secondary winding effectively suppressing undesired interactions of individual winding sections of the primary winding.

Preferably, said primary and secondary windings have substantially parallel winding axes, in particular one common winding axis. This considerably diminishes the required manufacturing effort. If any turns of said secondary winding extend between the turns of the primary winding, the turns of the secondary winding will shield the turns of the primary winding from each other. This will largely eliminate any undesired effects between individual turns of the primary winding which occur in other designs and, cumulated, will cause the disadvantageous resonance effects. If the turns of the primary and secondary windings each are wound the ones on top of the others in a radial direction, a comparatively analogous result is obtained regarding self-resonance suppression.

The possibility of varying the ohmic resistance of said attenuation circuit e.g. by means of an ohmic resistor, allows the attenuation behaviour to be influenced precisely.

The presence of the secondary winding according to the invention allows an increase both of the reproducibility and the precision of remote feeder reactance coils, at the same time leaving a lot of leeway concerning the dimensions, choice of material and wiring of said secondary winding. Another possibility is to electrically connect one end of the secondary winding to the primary winding. Furthermore, if one substitutes complex functioning circuitry for the ohmic resistor, this will allow a well-aimed influencing of the behaviour of the attenuation winding in the frequency range.

Additional advantageous embodiments and further developments of the invention are notable from the subclaims and the description in combination with the drawings, of which:

Fig. 1 is a schematical view of a transmission section of a signal transmission line of a signal transmission system;

Fig. 2 a graphical view of the possible influence of a remote feeder reactance coil lacking any self-resonance-supporting measures on the transmission behaviour of a signal transmission system;

Fig. 3 a view of a first embodiment of a remote feeder reactance coil of the invention, and

Fig. 4 a view of a second embodiment of a remote feeder reactance coil of the invention.

The transmission section 10 of a signal transmission line shown in Fig. 1 essentially comprises a coaxial cable 14 which has two intermediate amplifiers 16 built into it. Said inter-

mediate amplifiers 16 receive their energy via remote feeder reactance coils 18 of the inventive design which are grounded via a capacitor. The energy output via said remote feeder reactance coils 18 is input to the transmission section 10 (which - concerning energy supply - is separated from the adjacent transmission sections by capacitances 22) via a remote feeder reactance coil 20 for energy input which is likewise of the inventive design and is also grounded via a capacitor.

Fig. 2 shows the possible influence a remote feeder reactance coil lacking any self-resonance-supporting measures may have on the transmission behaviour. It may be gathered from this view that the a.c. resistance will decrease with certain frequencies. This is tantamount to a negative influence on a wanted signal to be transmitted.

Fig. 3 shows a remote feeder reactance coil 100 of a first embodiment of the invention. Said remote feeder reactance coil 100 comprises a primary winding 102 of copper wire which is e.g. wound about a tubular body 104 made of plastic material. Inside said tubular body 104 is a core 106 of ferromagnetic material. The primary winding 102 has its terminal 108 connected to a signal transmission line and its terminal 120 connected to the energy supply.

Extending in parallel to said primary winding 102 is a secondary winding 112 of copper wire whose turns 114, just like the turns 110 of the primary winding 102, extend in close contact with and on said tubular body 104. The turns 114 of the secondary winding 112 extend between the turns 110 of said primary winding 102 and are thus uniformly spaced, likewise viewed from the longitudinal direction of the remote feeder reactance coil. Said secondary winding 114 is closed by an ohmic resistor 116 which is schematically shown, to give an attenuation circuit 118.

Coated on the turns 110 and 114 of the primary and secondary windings 102, 112, resp., i.e. on at least one winding

thereof, is a layer of insulating varnish so as to electrically insulate said turns 110, 114 from each other.

In operation, the terminal 108 of said primary winding 102 is connected to the high-frequency part of a circuit or a signal transmission line. The terminal 120 is both connected to a low-frequency energy input and, via a capacitor for electric shock hazard protection, to circuit ground. In operation, the secondary winding 112, together with the ohmic resistor 116, will generate a resistance load along a section of said primary winding 102, which load will effectively suppress the formation of parasitic resonances in the useful frequency range without considerably influencing the characteristics of said remote feeder reactance coil 100 in high-frequency applications.

Fig. 4 shows a remote feeder reactance coil 200 of a second embodiment. Since the remote feeder reactance coils 100, 200 of the first and second embodiments are identical in essential design features, design elements of the remote feeder reactance coil 200 of the second embodiment which are identical to those of the remote feeder reactance coil 100 of the first embodiment are marked with basically the same reference numerals as those of the first embodiment, but increased by 100. In this respect, reference is also made to those parts of the description which concern the remote feeder reactance coil 100 of the first embodiment.

The individual turns 210 of the primary winding 202 of the remote feeder reactance coil 200, which are electrically separated and insulated from each other by means of a varnish coating on the wire material of the primary winding 202, extend in direct and close contact on each other in a first area 222 and a second area 224, while they are spaced from each other in a third area 226 which extends between said first and second areas. Said secondary winding 212 which also includes an ohmic resistor 216 to give an attenuation circuit 218, has turns 214 which, viewed in the radial direction of the remote feeder

reactance coil 200, extend on the external surface of the turns 210 in the first area 222. Said turns 214 contact each other through their varnish coatings. In the remote feeder reactance coil 200 of the second embodiment, the terminal 200 of the primary winding 202 and the terminal of the secondary winding 212 are electrically interconnected.

C L A I M S

1. A remote feeder reactance coil for supplying energy to, or withdrawing energy from, signal transmission lines, comprising a primary winding (102;202) of an electrically conductive material which carries the feed current, as well as an attenuation circuit (118;218)

characterized in that

said attentuation circuit (118;218) includes a secondary winding (112;212) of e.g. an electrically insulated conductive material, wherein said secondary winding (112;212) and said primary winding (102;202) interact with each other through capacitive and/or inductive coupling.

2. The remote feeder reactance coil of claim 1 characterized in that said primary and said secondary winding (102;112; 202;212) have substantially parallel winding axes, in particular one common winding axis.

3. The remote feeder reactance coil of claim 2 characterized in that the turns (114) of said secondary winding (112) extend between the turns (110) of said primary winding (102).

4. The remote feeder reactance coil of claim 2 characterized in that the turns (214) of said secondary winding (212) are wound within the turns of said primary winding, below the latter, or outside and on the turns (210) of said primary winding (202).

5. The remote feeder reactance coil of one of claims 1 to 4 characterized in that said conductive material of said

secondary winding (112;212) is a material with an ohmic resistance.

6. The remote feeder reactance coil of one of claims 1 to 5 characterized in that said attenuation circuit (118;218) includes e.g. an ohmic resistor (116;216) for connecting the terminals of said secondary winding (112;212).

7. The remote feeder reactance coil of one of claims 1 to 5 characterized in that said attenuation circuit includes a foil or a layer of conductive varnish with an ohmic resistance for connecting the terminals of said secondary winding.

8. The remote feeder reactance coil of one of claims 1 to 5 characterized in that said attenuation circuit includes an arrangement of at least one ohmic resistor and one further reactive element for connecting the terminals of said secondary winding.

9. The remote feeder reactance coil of one of claims 1 to 8 characterized in that said attenuation circuit (218) includes a terminal which is electrically connected to said primary winding (202).

10. The remote feeder reactance coil of one of claims 1 to 9 characterized in that said primary winding (102;202) and/or said secondary winding (112;212) at least consist of one insulated wire.

11. The remote feeder reactance coil of one of claims 1 to 10 characterized in that said primary winding (102;202) is spirally wound up onto a core (106;206) or a tubular body (104;204).

12. The remote feeder reactance coil of claim 11 characterized in that said tubular body (104;204) is of an electrically

insulating material and encompasses a core (106;206) of ferromagnetic material.

13. A signal transmission system with signal transmission lines, whose intermediate amplifiers (16) are supplied with electrical energy via said signal transmission lines (14), with remote feeder reactance coils (18,20) used for this purpose being of the type as claimed in one of claims 1 to 12.

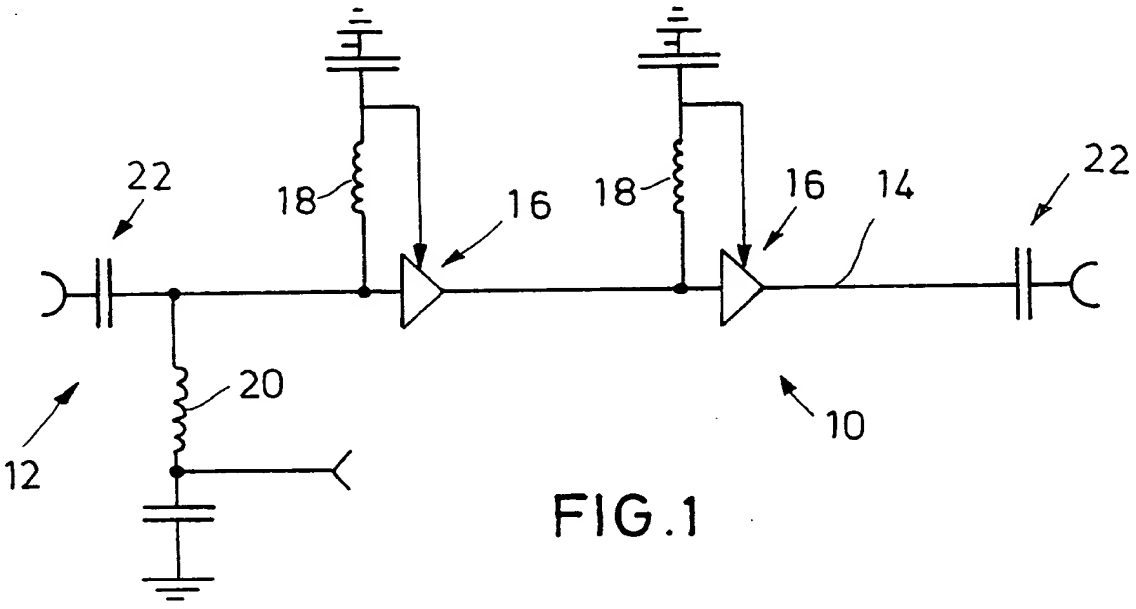

FIG.1

FIG.2

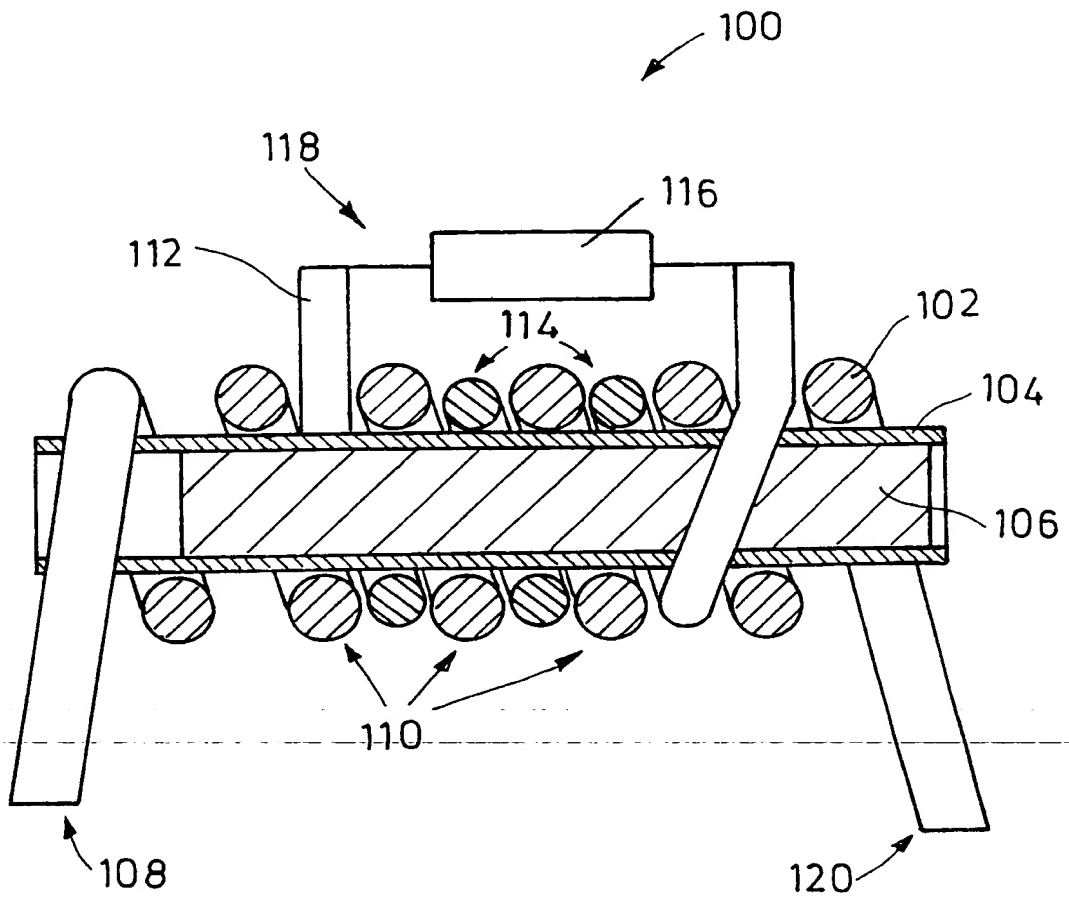

FIG. 3

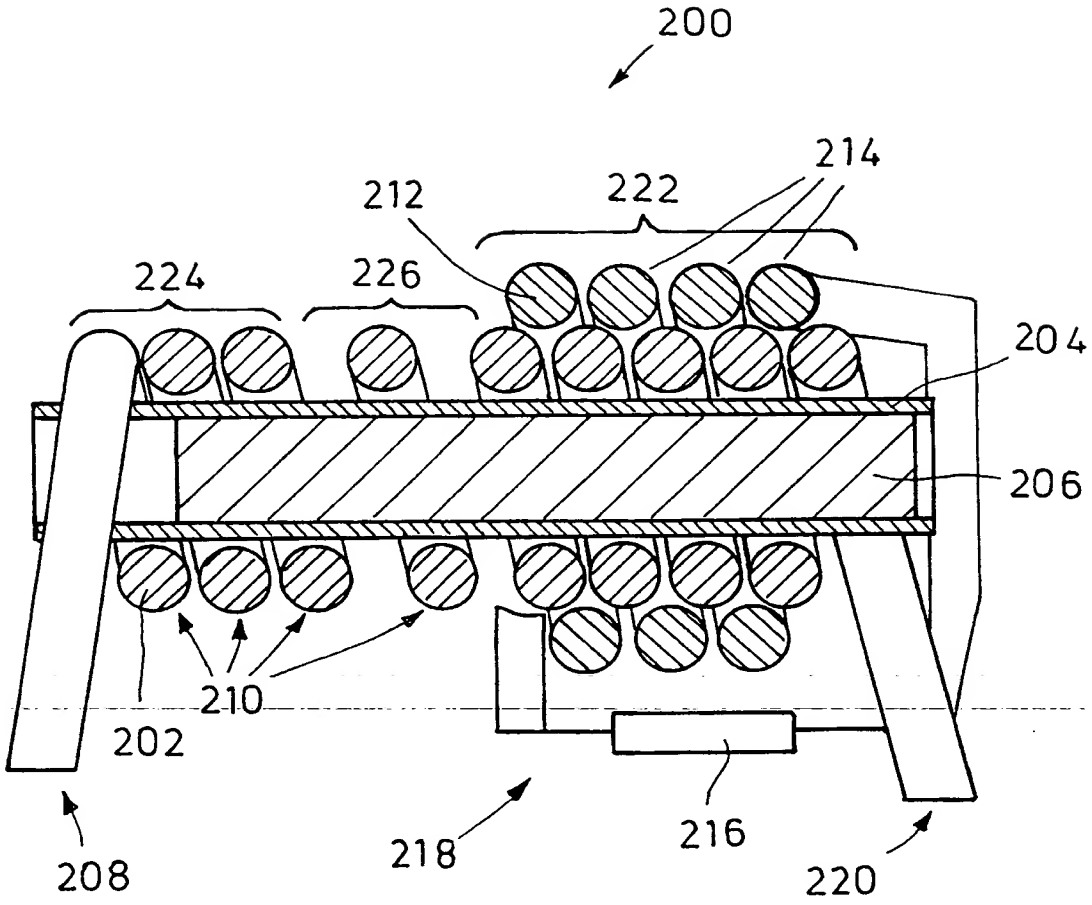

FIG. 4

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 99/10100

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04B3/56 H01F27/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04B H01F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 4 961 049 A (GHISLANZONI LUCA) 2 October 1990 (1990-10-02) column 3, line 22 - line 43; figure 1 column 3, line 54 - line 64 column 9, line 10 - line 17; figure 7	1-6,8, 10-12 13
Y	WO 98 40980 A (VIDEOCOM INC) 17 September 1998 (1998-09-17) abstract page 25, line 5 - line 17; figure 8 page 28, line 1 - line 15; figure 9A page 29, line 6 - line 25; figure 9B	13

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 February 2000	22/02/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax (+31–70) 340–3016	De Iulis, M

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/EP 99/10100

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4961049 A	02-10-1990	FR 2624617 A	16-06-1989
		CA 1293538 A	24-12-1991
		DE 3880280 A	19-05-1993
		EP 0320341 A	14-06-1989
		JP 1265168 A	23-10-1989
		JP 2598496 B	09-04-1997
WO 9840980 A	17-09-1998	AU 6462298 A	29-09-1998

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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70) 14

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
4335/65 WO		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP99/10100	17/12/1999	18/12/1998
International Patent Classification (IPC) or national classification and IPC H04B3/56		
Applicant FUBA COMMUNICATIONS SYSTEMS GMBH et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☒ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
25/05/2000	21.03.2001
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Lauri, L Telephone No. +49 89 2399 7304

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP99/10100

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).)*:
Description, pages:

1-7 as originally filed

Claims, No.:

1-13 as originally filed

Drawings, sheets:

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application.

☒ claims Nos. 8.

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☒ the claims, or said claims Nos. 8 are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination report cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N) Yes: Claims 3, 7, 9-13

	No:	Claims	1, 2, 4-6
Inventive step (IS)	Yes:	Claims	13
	No:	Claims	1-7, 9-12
Industrial applicability (IA)	Yes:	Claims	1-13
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

CITED DOCUMENTS

D1: US-A-4 961 049 (GHISLANZONI LUCA) 2 October 1990 (1990-10-02)

Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

Contrary to the requirements of Art. 6 PCT, claim 8 is not supported by the description. The reason for this objection is that the use of a reactive element in the attenuation circuit and its advantages have not been discussed in the description. The only support that can be found is for the substitution of the ohmic resistor by complex functioning circuitry (p. 4, l. 10-11).
As a consequence, on the basis of Article 34(4)(a)(ii) and Article 35(3)(2) PCT, no statement under Article 35(2) PCT can be delivered.

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. The present application does not meet the criterion set forth in Article 33(2) PCT because the subject-matter of claim 1 is not novel over the prior art.
Document D1 describes a transformer having the following features of claim 1:
   - it is suitable for supplying and withdrawing energy (this is a general feature of any coil) from a transmission line;
   - a primary winding (P) of an electric conductive material which carries the feed current (I),
   - an attenuation circuit (the secondary and its loading element in Fig. 7);
   - said attenuation circuit includes a secondary winding (S) of an electrically insulated conductive material (usual feature of any transformer as shown in Fig. 7);
   - said secondary winding and primary winding interact with each other through capacitive and/or inductive coupling (windings P and S in Fig. 7).

2. Dependent claim 2 does not contain any features which, in combination with the features of claim 1, to which it refers, meet the requirements of the PCT in respect of novelty and inventive step, the reason being that D1 shows (Figs. 1 and 7) a transformer where the primary and secondary windings have substantially parallel winding axes.

3. The dependent claims 3, 7, 9-12 consist of the obvious selection among a number of well known possibilities not involving an inventive step. They all belong to the usual alternatives available in the construction of a transformer.

4. Dependent claim 6 does not contain any features which, in combination with the features of any of the claims 1 to 5, to which it refers, meet the requirements of the PCT in respect of novelty and inventive step, the reason being that D1 shows (Figs. 1 and 7) a transformer closed on an ohmic resistor.

5. The dependent claims 4 and 5 describe obvious inherent features of the elements of a transformer.

6. The novelty and inventive step of the combination in claim 13 do not appear to be prejudiced by the available prior art.
The invention relates to signal transmission, along a cable line. In particular the invention assumes the use of remote feeder reactance coils which allow the transmission on the same line of the signals and of the power supply of the amplifiers.
The technical problem addressed by the invention is the unwanted oscillations that can arise because of coupling of inductances and capacities along the line.
The problem is solved by means of coils containing a passive element, namely they are transformers whose secondary winding is closed on a resistor.
Thus while the coils dissipate the energy of unwanted oscillations, they do not affect the transmission of the power supply.
The prior art document D1 describes a similar coil for use in a measurement set-up, however there is no indication of its use in a communication system.

Re Item VII

Certain defects in the international application

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D1 is not mentioned in the description, nor is this document identified therein.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
4335/65 WO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/EP 99/ 10100	17/12/1999	18/12/1998

Applicant

FUBA COMMUNICATIONS SYSTEMS GMBH et al.

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readbie form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 3

   [X] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
P[redacted]P 99/10100

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04B3/56 H01F27/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04B H01F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 4 961 049 A (GHISLANZONI LUCA) 2 October 1990 (1990-10-02) column 3, line 22 - line 43; figure 1 column 3, line 54 - line 64 column 9, line 10 - line 17; figure 7	1-6,8, 10-12 13
Y	WO 98 40980 A (VIDEOCOM INC) 17 September 1998 (1998-09-17) abstract page 25, line 5 - line 17; figure 8 page 28, line 1 - line 15; figure 9A page 29, line 6 - line 25; figure 9B	13

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 February 2000	22/02/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	De Iulis, M

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
P[redacted]P 99/10100

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4961049 A	02-10-1990	FR 2624617 A	16-06-1989
		CA 1293538 A	24-12-1991
		DE 3880280 A	19-05-1993
		EP 0320341 A	14-06-1989
		JP 1265168 A	23-10-1989
		JP 2598496 B	09-04-1997
WO 9840980 A	17-09-1998	AU 6462298 A	29-09-1998